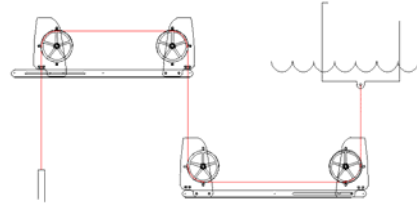


MEQIAS



Mechanical Liquid Level Indicator, using **DPR** technique for steel / concrete tanks and reservoirs.

Operating Principle:

MEQIAS is a simple float-operated mechanical water level indicator. Unique, because it offers **directly-proportional-reading (DPR)**, i.e. similar to the true water level inside water tank, mainly while level changes (increasing or decreasing), such that counterweight position at the measuring ruler outside tank moves exactly same as true water level inside tank. Not (Inversely-proportional-reading) as per conventional mechanical level indicators i.e. counterweight resides at ruler bottom while tank is full, vice-versa, counterweight hoists at ruler top while tank is empty!

MEQIAS ' float-cylinder moves up and down on top of the liquid inside the tank, stainless steel wire rope is connected to the float-cylinder and two special mechanisms – one at tank bottom and the other at tank roof – then connected to the suspended counterweight that can freely travel up and down within aluminum purlins (gauge board) along tank elevation / operating-span, such that legible reading of water tank level could be read directly. Purlins are marked off in meters with black band paint. 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 graduation/numbering could be affixed beside purlins in a directly proportional numbering starting from down to up.

Purlins, upper-mechanism, inside hooks and lower-mechanism can be bolted to concrete tanks or welded to steel tanks using suitable brackets.

Description:

It is made of high quality material, mainly stainless-steel even the bearings. The mechanism can withstand any climate and could be immersed fully in liquid for long time without any problem. Thanks to the robust design and high quality materials which grant durable (defect-free as well as maintenance-free) smooth function. Operating range = Customized as per site conditions and client desires.

Application:

MEQIAS is mechanically operated, float and stainless steel wire rope instrument designed to provide directly proportional liquid level measurement in medium storage tanks and bulk storage applications. Suitable for atmospheric tanks, low pressure tanks and reservoirs.

The measured level is showed physically at aluminum gauge board (purlins); red colored 25X25cm counterweight glides up and down along the gauge board according to true water surface level inside the tank.

Main Parts & Installation Guidelines:

1* *Counterweight*: made of two 25mm thick black steel plates joined to each other via six 10mm hex-bolts. Backside of counterweight has the six integrating bolts; front-side has no bolts appearing. The inner sides of these two plates have v-groove to accommodate the 4mm diameter stainless steel suspending wire rope. When the hex-bolts are tightened, the two plates become integrated as one piece (counterweight). There is 30mm hole diameter at the bottom of the counterweigh comprising tight termination for the wire rope extremity. Net weight of counterweight approaches 25kg, dimensions and shape are 5X25X25cm with curved bottom to be suitable to glide inside purlins path easily. The counterweight has double priming coats as well as double finishing red-colored epoxy coats to be distinguished easily from remote, and to withstand harsh climates. Please refer to Addendum # 1 for farther details.

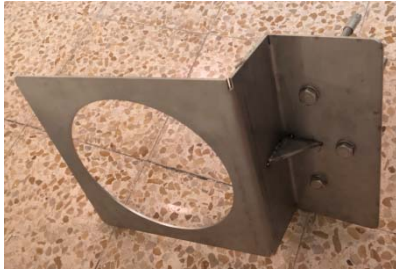


2* *Stainless steel wire rope*: is a 4mm diameter stainless steel suspending sling wire. Its formation is 7X19 highly flexible construction 304 stainless steel wires, suitable for most running load application as well as numerous other applications. Please refer to Addendum # 2 for farther details.



3* *Stop scabbard*: made of 3mm thick stainless steel sheets with extra welding and support at its bottom. The main function of this scabbard is to prevent the counterweight

to travel beyond purlins bottom-end, and most importantly, to stop free falling of counterweight down accidentally or during installing the system. The stop scabbard has thick fibers band to prevent elastic-collision of the counterweight with the scabbard stainless steel body in case of free fall down. The scabbard has 200mm diameter opening at its front-face as an error-flag were anyone can easily see the red counterweigh if failed inside the scabbard and know that something went wrong with suspension system so maintenance people are invoked to checkup and fix the problem. Stop scabbard has three 10mm stainless steel bolts at its bottom to fix it firmly to concrete-wall and withstand shear force that might develop during faulty condition.



4* *Aluminum Purlins*: are made of 3mm thick aluminum sheets, with 1m length of each purlin to make it easy to handle and install as a lightweight members during installation. Each member has four fixing holes at the sides (not interfering with inside trough of the purlins). 10mm diameter 10cm length SS threaded rods are used to fix purlins to the tank wall. Fixing system has enough maneuvering span to adjust each purlin member fixing-distance away or to adjacent wall as well as up/down, right/left fine tilting. The upper and lower edges of each vertically installed purlin member were fitted with snap-fit black rubber frame to tolerate thermal expansion factor of tightly-adjacent (touching each other) aluminum members'.

Vertically lined-up purlins are pre-painted with thick black color bands each one meter length. There are other thinner black bands in-between as precise graduation.



5* *Inlet purlin*: this member is constructed same as aforementioned purlins, but it has somehow funnel-shape edges at its top-side to facilitate gliding the heavy counterweigh to the trough at the first time of installation. The remaining small down-part of the inlet

purlin works as a buffer for the counterweight movement within the upper side of the ruler.



6* *Upper Mechanism*: made of two 3mm stainless steel skeletons affixed at two bottom base frame each comprising four 16mm diameter holes for fixing the mechanism and leveling it duly. Each stainless steel skeleton has aluminum pulley painted with priming and blue-colored epoxy coating to protect it from corrosion. Aluminum pulleys were used - rather than stainless steel ones - because they are lighter in weight and would not cause massive friction as well as heavy moment of inertia to the system overall as we have four pulleys! Each pulley were balanced and fixed to the stainless steel skeleton via two stainless steel bearings. Bonding stainless steel sleeves were used around each pulley to protect slippage of SS wire rope outside the groove as well as to grant system stiffness and precession. In deed all bolts, nuts, washers, stringed washers, sleeves, bearing housing, axes and even bearings themselves are all made of high grade stainless steel to have fault-free fully functional system even during permanent emersion in fluid.

Finally, it worth to mention that one of the two skeletons assembly (comprising pulley) could be shifted back or forth (350mm adjustable range) to adapt site conditions and receive or suspend the SS wire rope in a professional and reliable way that suits true site conditions.



7* *Lower Mechanism*: typical to upper mechanism but with different SS wire routing.

8* *Wall Hooks*: made of 3mm thick stainless steel sheets with 300mm adjustable span to govern closeness of stainless steel wire to the tank inside-wall. The 300mm

adjustable span has wedge with 30mm hole to pass the SS wire through it. The wedge can be moved/adjusted back and forth by untightening the two bolts and nuts at its sides, move then re-tighten permanent set out. The final goal is to grant plumb / vertical installation of the SS wire rope.



9* *Cylindrical Float*: made of 1mm thick stainless steel sheets (except bottom plate, made of 3mm stainless steel sheet) to withstand worst case scenario of buoyancy force influencing the float cylinder up while cylinder is submerged or even emerged fully in the fluid! Float has cylindrical shape - not spherical one - to utilize max possible buoyancy force at the float thick bottom were hook to match it to the S.S. wire rope presents. Float cylinder is hermitically sealed by argon welding, its bottom is 60cm diameter and its height is also 60cm. Please refer to Addendum # 3 for calculations and farther details.



10* *Fixing Ancillaries*: Mainly HILTI 12mm diameter stainless steel anchors with chemical-anchoring appurtenances, 10mm diameter stainless steel short-threaded-rod with stainless steel bolts, washers and threaded expansion shell anchors. Please refer to Addendum # 4 for farther details.

Ancillaries:

MEQIAS liquid indicator is supplied with a complete fixing kit that includes all necessary purlins work, threaded expansion shell anchor, chemical anchoring, tie fittings, inside hooks, brackets and full installation instructions.

Installation within concrete tank requires one 60~100mm diameter hole in the tank roof for the stainless steel cable, six 14mm diameter holes for upper mechanism chemical anchoring and eight 14mm diameter holes for lower mechanism chemical anchoring.

For easy installation, tank must have suitable scaffolding inside as well as outside.

Special Features:

- * Offers directly proportional reading. Thanks to DPR technique.
- * Robust design with premium quality materials that grant minimal need for maintenance.
- * Can be used for concrete tank/reservoirs as well as metal-tanks.
- * Easy to read, legible-reading through 8" net-reading-width of measuring ruler (purlins).
- * Suitable for virtually any liquid.
- * Easy mounting (full installation details are furnished).
- * Suitable for harsh operating conditions (dusty, humid, hot-climate/cold-climate).
- * Local product, long service life guaranteed and with competitive price.



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